is somehow supplied, cause water to pass into a solution; for on the side of the solution it holds less water than on the side of the water unless the solution is raised in pressure so as to bring the concentration of water in the ether to be the same throughout.

FRED. T. TROUTON.

University College, London.

The Weather of 1911.

IT is probably no exaggeration to say that all students of meteorology who have been fortunate enough to read Sir Edward Fry's letter in NATURE of November 16 have been greatly impressed by it, and have awaited with eagerness the discussion to which it must inevitably lead. Already, at this early stage, they must feel a sense of gratitude to the writer of the letter for having enriched the science by calling forth the excellent reply from Dr. Shaw in the number of November 30.

Now, as was to be expected, that ultra-violet solar radiation has come up for consideration, and Dr. Carl Ramsauer, in the issue of December 14, has entered a strong plea for recognition of the part it did not play in producing rain, in Europe, during the summer and fall of 1911, the time seems ripe for "the other side of the world" to enter the discussion, so that European men of science may take a glance "out and beyond their latticed home," and realise that sunshine and meteorological changes are phenomena quite commonly witnessed in other regions of the earth.

It is to be understood that nothing in this letter is to be considered as the result of a careful study of observational data, and, furthermore, that the ideas here expressed have been inspired solely by articles in NATURE, by my personal experience, and by a cursory knowledge of meteorological changes gained from the weather chart of the Argentine Meteorological Office, which shows the daily changes over the southern half of South America, a region quite as extensive as, if not much greater than, all Europe.

In his interesting article, Dr. Ramsauer says, amongst other things, that he and Prof. Lenard have distinguished three actions of ultra-violet light on dust-free gases, and that one of these actions is the "formation of condensation nuclei." This, he says, gives us the *chief* source of nuclei in the earth's atmosphere, which are meteorologically so important; and his final conclusion is:—"Thus the lack of nuclei, and the consequent fine weather of the year, can be attributed to a *much diminished ultra-violet radiation of the sun*." (The italics are mine.) He makes no mention as to variable efficiency in different parts of a bundle of solar rays, and so his conclusion must be taken as uniformly applicable to the entire bundle of rays impinging upon the earth. As the difference of longitude between the two continents is only a few hours, it may be assumed that the solar rays falling upon Europe and South America constitute separate parts of a single uniform bundle of rays; also, as ultra-violet rays are to be considered as the controlling agency in the production of condensation nuclei, they must be assumed to be most active, and rainfall therefore most copious, over the continent with the midsummer sun. Let us see how far his conclusions are justified by facts.

During the mid-year and later months of 1911 Europe experienced an unprecedented season of heat and drought, beneath the unobstructed rays of a high sun; Dr. Shaw states that apparently all requisites for dense clouds and heavy rains were frequently satisfied, and Dr. Ramsauer suggests that the poverty of the intense solar rays in ultra-violet waves was responsible for the fact that no precipitation occurred. During the same period, July to November, a portion of South America equal in extent to Europe, under the relatively feeble radiation of a low sun, was treated to a superabundance of condensation nuclei, and probably to the most excessive drenching ever noted in this part of the world. The current conditions, with reversed seasons, are really just as interesting. The rains continued here during the summer solstice and ended suddenly on January 1; so that, on passing through perihelion, although the sun was not far from the zenith, and was about five million miles nearer than when Europe experienced its extraordinary weather, sending out proportionately more intense ultra-violet and all other kinds of solar rays, the sky was clear, and has remained practically so during the past two weeks of our midsummer, notwithstanding that this is normally the rainy season of the year, and conditions are favourable for the development of showers and even general rains; meanwhile in Europe, *mirabile dictu,* the advent of the new year has been marked by disastrous floods in many parts.

Do not these facts constitute another exemplification of the saying that "one-half of the world does not know (usually realise) how the other half lives," and of the further thought that it is extremely difficult completely to interpret cosmical processes by means of laboratory experiments?

In the present state of the sciences of meteorology and solar physics it is impossible to look upon these perfect and abnormal contrasts of the past year in the conditions in Europe and South America as merely fortuitous occurrences. In seeking for their explanation we must inevitably follow Dr. Shaw in ascribing the important terrestrial activities to the dynamics of the upper air, and amplify his proposition slightly by naming the sun as the prime source of all the trouble. Is it not possible that with the already long period—nearly two years—of almost complete quiet on the solar disc, the conditions on the earth are approximating to what they would be if the sun were not a variable star? With a constant output of solar energy would not the atmospheric layer contained between the isothermal region and the earth's surface act more uniformly, like an engine—the part over the summer hemisphere, being heated by the most intense radiation during long days, acting as steam chest; the part over the winter hemisphere, cooling through long nights and feeble solar radiation, acting as condenser, while the convective processes of the equatorial region serve as the safety-valve through which would be brought about an orderly alternation of hot and relatively dry summers, and wet but not extremely cold winters in both hemispheres?

It is probable that a complete answer to Sir Edward Fry's question will have to come from some such world-wide conception as this rather than from a study of meteorological conditions on a particular continent. Possibly the pronounced conditions during the past year may point out a way for alleviating to some extent the disappointment of those investigators who seek to establish a well-defined periodicity in temperature and rainfall variations based upon the variability of the sun, as they apparently emphasise the necessity of determining exactly the epochs of maxima and minima in the sun's own period, and taking account of his position in the ecliptic at such times. If a minimum, for instance, coincide with a solstice, then an abnormally hot and dry summer in one hemisphere, with an abnormally wet and probably warm winter in the opposite one, should be considered as confirming the sun-spot theory, and not as contradicting it, and so the effect may be graduated

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around the ecliptic, being least pronounced probably when a minimum falls in an equinoctial month. A hasty comparison of Dr. Wolfer's relative sun-spot numbers with the rainfall data of a few widely separated stations appears to hold out some encouragement for treating the data in this way.

L. G. Schultz.

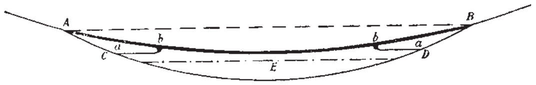
Oficina Meteorológica Argentina, Observatorio
Magnético, Pilar, Córdoba, January 16.

Concentric Joints in Ice.

In Nature for January 25 a correspondent directed attention to concentric joints and bulbs which he noticed in the thin ice-sheets which covered several small partially dried-up pools, and stated that he would like to have an explanation of their cause.

I have seen circular ribs on the underside of ice-sheets on small pools which would appear to have been formed as shown by the accompanying diagram.

When the pool was full of water, a thin sheet of ice formed between A and B. As the water sank into the ground an air space *aa* formed near the margins, the ice at the same time sagging. During the frost the further inward spread of the air space was arrested for a time by the freezing of the ring *bb*. Soon, however, in spite of the growth of the ring, the fall of the water-level allowed the air space *aa* suddenly to increase in size, and another ring was then formed inside the first, the process being repeated several times, until the water-level fell to E clear of the ice. From the water surface evaporation took place, and the vapour condensed on the underside of the ice-sheet, thickened it and made the ridges more pronounced and bulb-like.



The number of rings and the thickness of the ice depend upon the keenness of the frost and the rate at which the water-level falls.

A similar structure can be produced by perforations in thin ice-sheets partially supported by vegetation. The innermost ring is then the one first formed.

The fact that lines of weakness are produced above each rib is interesting, but has escaped my notice.

R. M. Deeley.

Inglewood, Longcroft Avenue, Harpenden.

Remuneration of Public Analysts.

On behalf of the Association of Chemical Technologists, I beg to enter a strong protest against the course of action that is being followed by the Lambeth and Wandsworth Borough Councils in regard to the filling of the appointments of public analyst for those boroughs which have become vacant by the death of Dr. John Muter.

The terms of remuneration offered by both these borough councils are far below the lowest of the very inadequate rates of payment made to public analysts in London and throughout the country, and the acceptance of such appointments by a qualified scientific chemist on such terms would be degrading to the chemical profession and detrimental in the highest degree to the interests of the public. On the terms offered, it is absolutely impossible that the responsible duties attaching to such appointments can be efficiently performed. A public analyst has great personal responsibility, his position is one of considerable anxiety, the value of his work is not generally understood, and the office he holds is widely disliked, for he is appointed under the provisions of Acts of Parliament which are extremely unpopular among certain sections of the community. It is therefore essential that he should be in a position of such independence that he may not be liable to influence or pressure from any persons whose interest it may be to prevent, so far as possible, the effective administration of the Acts. It must be remembered, too, that with the enormous increase in scientific adulteration, the work of a public analyst is to-day very different from the work required even ten years ago, and it is therefore all the more necessary that the general public for whose protection the Acts were passed should appreciate the advisability of preventing the ever-increasing attempts of local authorities of a certain type to reduce the remuneration of the scientific officers concerned to a level rendering the satisfactory discharge of their duties impossible.

J. Wilberforce Green (*Secretary*).

30 Victoria Street, Westminster, London, S.W.,
March 6.

The Storm of March 4.

In Nature of March 7 reference is made to the storm of March 4, and figures are quoted giving the velocity of the wind recorded at several stations. It would appear that the storm attained a greater velocity here than at either of the stations named, and a few particulars of the record made by the Dines pressure-tube anemometer erected at Pendennis Castle, Falmouth, by the Meteorological Office, may be of interest.

On the morning of March 4 a progressive mean velocity of from 20 to 50 miles an hour was recorded; at 6 p.m. it had increased to 65 miles per hour, and this velocity was maintained to midnight. The squalls were very violent; between 2 p.m. and midnight a maximum velocity of 80 miles or more was registered more than twenty times, whilst the greatest squall attained a velocity of 98 miles at 6 p.m. This has been but once exceeded (or reached) since the anemometer was erected in 1902, viz. 103 miles at 11.30 p.m. of March 14, 1905.

Edward Kitto (*Superintendent*).

The Observatory, Falmouth, March 11.

Observed Fall of an Aërolite near St. Albans.

During a heavy thunderstorm which ensued on Monday, March 4, between 2.30 p.m. and 4.15 p.m., an aërolite was observed to fall at Colney Heath, near St. Albans. The observer, who has placed the specimen in my hands for examination, stated that the stone fell within a few feet from where he was standing, and that it entered the ground for a distance of about 3 ft. Its fall was accompanied by an unusually heavy clap of thunder. The example weighs 5 lb. $14\frac{1}{2}$ oz., and measures $6\frac{3}{4}$ in. × $5\frac{5}{8}$ in. at its greatest length and breadth respectively. The mass is irregularly ovate on the one side, and broken in outline on the other. The actual surface throughout is fairly deeply pitted, and under magnification exhibits the usual chondritic structure of the crystalline matter, with interspersed particles of what appears to be nickeliferous iron.

G. E. Bullen.

Hertfordshire Museum, St. Albans.

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